

Docket No. KOT-0094

MAR 14 2007

**REMARKS**

Claims 1-20 were pending in the present Application. Claims 1, 19 and 20 have been amended, and Claim 2 has been canceled, leaving Claims 1, 3-20 for consideration upon entry of the present Amendment.

No new matter has been introduced by these amendments. Support for the amendments to Claim 1 can be found in original Claim 2, now cancelled. Support for the amendment to Claims 19-20 can be found in the carryover paragraph of pages 45-46.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

Miscellaneous

Before substantively addressing each one of the rejections, it should be clear that the Claims are generally directed to two pairs of reactive components. The first pair includes the featured binder compound having a reactive group capable of cationic polymerization (e.g., feature A of independent claims 1, 18, and 20); and the crosslinking agent which reacts with the reactive group in the binder compound, wherein the crosslinking agent is a thermal cationic polymerization initiator represented by Formulas 1 or 2 (e.g., feature D of independent claims 1, 18, and 20). The first pair is used to fix the recording composition containing features B and C by means of a thermal reaction of the binder component (feature A) and the crosslinking agent (feature D). Hence, the use of a thermal cationic polymerization initiator.

The second pair of reactive components includes the featured polymerizable compound having an ethylenic double bond in the molecule; and the photoinitiator (features B and C, respectively, of independent claims 1, 18, and 20). As the name "photoinitiator" implies, the use of light is utilized to activate the photoinitiator. The photoinitiator and a polymerizable compound having the ethylenic double bond in the molecule are used to record the holographic image via free radical polymerization.

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It will be apparent to those of ordinary skill in the art that the reaction of Pair 1 proceeds by heating the thermal cationic polymerization initiator (D) to initiate cationic polymerization of the binder compound (A), which has a reactive group capable of undergoing cationic polymerization. The claimed pair of reactive components is not affected during holographic image formation. To achieve the thermal reaction of the cationic polymerization initiator D with A, the compounds represented by Formula 1 and 2 are claimed.

Formula 1 has a single aryl group in the molecule whereas Formula 2 is free from an aryl group in the molecule. The chemical compounds provided by Formula 1 and 2 are effective to release a cation upon heating, not upon irradiation with light. In other words, the compounds defined by formulas 1 and 2 are not effective to act as cationic photopolymerization initiators. One of skill in the art would appreciate this distinction.

The properties of D are described in Applicants' original specification on page 13, lines 10-15, as reproduced below.

"The thermo cationic polymerization initiator has a property to produce an active species after being subjected to heat. The thermo cationic polymerization initiator is inactive to the polymerization compound B. The thermo cationic polymerization initiator is a compounds which behaves as a cationic polymerization agent but *not* behave as a radical polymerization agent."

[Emphasis added]

These are important distinctions when considering the teachings and/or suggestions provided by the applied prior art that serve as the basis for the rejections in the present Office Action.

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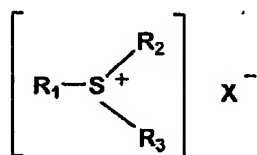
Claim Rejections Under 35 U.S.C. § 102(b)

A. Claims 1, 4, 5, 7-9, 14, 17, and 20 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 5,453,340 to Kawabata et al. (hereinafter "Kawabata"). Applicants respectfully traverse this rejection.

To anticipate a claim under 35 U.S.C. § 102, a single source must contain all of the elements of the claim. *Lewmar Marine Inc. v. Barient, Inc.*, 827 F.2d 744, 747, 3 U.S.P.Q.2d 1766, 1768 (Fed. Cir. 1987), *cert. denied*, 484 U.S. 1007 (1988).

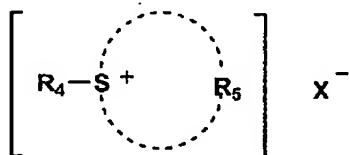
Kawabata fails to disclose each and every claim feature. For example, independent Claim 1 features, *inter alia*, a cross-linking agent that reacts with a reactive group in a binder compound, wherein the cross-linking agent is a thermal cationic polymerization initiator, represented by Formula (1) or Formula (2):

Formula (1)



wherein R<sub>1</sub> is a substituted or unsubstituted aromatic group, each R<sub>2</sub> and R<sub>3</sub> is independently a substituted or unsubstituted alkyl, cycloalkyl, aralkyl group, and X<sup>-</sup> is a counter anion;

Formula (2)



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wherein  $R_4$  is a substituted or unsubstituted alkyl, cycloalkyl, aralkyl group,  $R_5$  is a substituted or unsubstituted hydrocarbon group which forms 5 or 6-membered ring with sulfur, and  $X^-$  is a counter anion.

There is no disclosure of the compounds represented by Formulas 1 or 2. Although a variety of onium salts are disclosed in Kawabata at Col. 6, lines 8-18, the triarylphenylsulphonium compounds described therein are different from those compounds represented by Formula 1 or Formula 2. The claimed compounds featured by Formulas 1 or 2 do not include triarylphenylsulphonium compounds. For instance, Formula 1 is directed to a single aryl group at the  $R_1$  position. The  $R_2$  and  $R_3$  positions are not defined as aryl compounds but rather are substituted or unsubstituted alkyl, cycloalkyl, aralkyl group,  $R_5$  is a substituted or unsubstituted hydrocarbon group which forms 5 or 6-membered ring with sulfur. Moreover, it is well known that triarylphenylsulphonium compounds can release a cation upon irradiation of light. In contrast, the compounds defined by Formula 1 do not release a cation upon irradiation of light. Likewise, Formula 2 is directed to sulphonium compounds having a 5 or 6-membered ring formed with the sulfur moiety.

Independent process Claim 20 features a cross-linking agent that reacts with the reactive group in the binder compound and further a thermal cationic polymerization initiator. Again, for reasons discussed above, Kawabata fails to disclose thermal cationic photopolymerization cationic initiators nor of a heating step to stabilize the holographic image.

In view of the foregoing the rejection is requested to be withdrawn.

B. Claims 1, 4, 5, 7-9, 14, 17, and 20 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Patent No. 5,776,634 to Ohkuma et al. (hereinafter "Ohkuma"). Applicants respectfully traverse this rejection.

Like Kawabata, Ohkuma also fails to anticipate the compounds as defined by Applicants' Formula 1 or 2. The cationic polymerization initiators described in Ohkuma's cols. 9 and 10 are different from the compounds represented by Formulas 1 and 2. All of the

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sulphonium type photo initiators described therein are triarylsulphonium compounds. As noted above, Formula 1 is limited to a single aryl group at the R<sub>1</sub> position. The R<sub>2</sub> and R<sub>3</sub> positions are non-aromatic. Likewise, there is no disclosure of compounds defined by Formula 2.

With regard to Claim 20, Ohkuma fails to disclose the use of thermal cationic polymerization initiators. The triarylsulphonium initiators are well known photoinitiators that a cation upon irradiation of light. This is not the same as the thermal cationic polymerization initiators as claimed.

For at least this reason, the rejection is requested to be withdrawn.

Claim Rejections Under 35 USC 103(a)

A. Claims 1, 2, 4, 5, 7-9, 14, 16, 17, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Kawabata in view of U.S. Patent No. 4,219,654 to Crivello (hereinafter "Crivello"). Applicants respectfully traverse.

Kawabata is generally directed to photosensitive compositions for volume holographic recording. The composition includes a) a liquid cationic polymerizable compound; b) a radical polymerizable compound; c) a radical photopolymerizable initiator composition sensitized by light to polymerize (b); and d) a cationic photopolymerization initiator composition sensitized by light at a different wavelength than that used to polymerize (c). There is no disclosure or suggestion of thermal cationic photopolymerization initiators.

Crivello is generally directed to a variety of photoinitiators including various onium salts.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

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Kawabata, individually or in combination with Crivello, fails to establish a *prima facie* case of obviousness because there is no disclosure or suggestion of the paired reactive components as claimed. As noted above in Applicants' Miscellaneous section, there are two pairs of claimed components. The first pair (i.e., claim features A and D) include a thermal cationic polymerization initiator (D) that is used to initiate cationic polymerization of a binder compound (A), which has a reactive group capable of undergoing cationic polymerization. The second pair of reactive components include a polymerizable compound having an ethylenic double bond in the molecule and a photoinitiator. There is no disclosure or suggestion in the cited references of a composition including, *inter alia*, a thermal cationic polymerization initiator as claimed that reacts with a binder compound having a reactive group capable of cationic polymerization or of a process that includes, *inter alia*, heating the thermal photoinitiator to stabilize the holographic image.

Kawabata fails to teach or suggest the thermal cationic polymerization initiator of formulas 1 and 2. Crivello discloses various photoinitiators. There is no teaching or suggestion in Crivello of its use as a thermal cationic polymerization initiator. Moreover, as discussed in Applicants' specification, the "thermocationic polymerization initiator [is] are compounds which behave[s] as a cationic polymerization agent but *not* behave as a radical polymerization agent." (See Applicants' original specification on page 13, lines 10-15). The photoinitiators disclosed by Crivello are specifically tailored for photoinitiation so as to generate radicals suitable for free radical polymerization.

The Applicants also respectfully submit that the present Office Action, in arriving at this specific construction, has destroyed the intent of the references. In this regard, the courts have held that "[i]f the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon* 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The courts have also held that "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie*

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obvious.”” *In re Ratti* 270 F. 2d 810, 123 USPQ 349 (CCPA 1959). Crivello is explicit in its description of its onium salts as being used as photoinitiators for free radical polymerization. Thus, the proposed modification would destroy the intended purpose of these compounds.

Still further, it has been well established that obviousness is not based upon what an artisan could do or what an artisan may try, but is based upon what an artisan would be motivated to do with an expectation of success. “Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, No. 04-1616 (CAFC March 22, 2006) citing *In re Lee*, 277 F.3d 1338, 1343-46 (Fed. Cir. 2002); and *In re Rouffett*, 149 F.3d 1350, 1355-59 (Fed. Cir. 1998). “When the [Examiner] does not explain the motivation, or the suggestion or teaching, that would have led the skilled artisan at the time of the invention to the claimed combination as a whole, [it is] infer[ed] that the [Examiner] used hindsight to conclude that the invention was obvious.” *Id.* Additionally, “[a]lthough the suggestion to combine references may flow from the nature of the problem, ‘[d]efining the problem in terms of its solution reveals improper hindsight in the selection of the prior art relevant to obviousness.’” (internal citation omitted) *Id.*, quoting *Monarch Knitting Mach. Corp. v. Sulzer Morat GmbH*, 139 F.3d 877, 881 (Fed. Cir. 1998); *In re Beattie*, 974 F.2d 1309, 1312 (Fed. Cir. 1992). Again, Crivello is explicit in its characterization of its onium salts as being photoinitiators. This is markedly different from Applicants composition and process that uses a thermocationic initiator for cationic polymerization.

In view of the foregoing, the rejection is requested to be withdrawn.

B. Claims 1-5, 7-9, 14, 16, 17, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ohkuma in view of Crivello. Applicants respectfully traverse.

Ohkuma and Crivello fails to establish a prima facie case of obviousness for at least the same reasons discussed above. Ohkuma discloses a composition containing a radical polymerizable monomer, a radical polymerization initiator, and a cationic-polymerization

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initiator as main constituents. Either the radical polymerizable monomer or the cationic polymerizable monomer is selectively polymerized to imagewise form a hologram. Subsequently, the entire face is exposed to light to polymerize the radical polymerizable monomer and the cationic polymerizable monomer in the non-image modes portion so as to provide adequate modulation of the refractive index. In the event the cationic polymerizable initiator has low radiation sensitivity, a sensitizing dye is included to increase radiation sensitivity. This is markedly different from Applicants claimed *thermal* cationic polymerization initiator.

Crivello is directed to photoinitiators as discussed above. There is no motivation to substitute the cationic polymerization initiator with the photoinitiators of Crivello for reasons discussed above. Even assuming, *en arguendo*, there is motivation, one of skill in the art would provide a sensitizing dye to further increase radiation sensitivity since that is what Ohkuma suggests.

In summary, there is no disclosure or suggestion of a composition or process that includes a thermal cationic polymerization initiator. Crivello fails to compensate for the deficiencies of Ohkuma since all of its initiators are characterized as photoinitiators.

In view of the foregoing, the rejection is requested to be withdrawn.

C. Claims 1-9, 14, 16, 17, and 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Ohkuma in view of Crivello and further in view of U.S. Patent No. 7,019,744 to Otaki (hereinafter "Otaki"). Applicants respectfully traverse.

Ohkuma and Crivello are discussed immediately above. For reasons discussed therein, Ohkuma and Crivello fail to disclose or suggest suggestion a composition or process that includes a thermal cationic polymerization initiator.

Otaki fails to compensate for the deficiencies of Ohkuma and Crivello. Otaki is generally directed to compositions including one or more photopolymerization compounds, a heat curable compound, and a latent heat-curing crosslinking agent. The latent heat curing



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crosslinking agent is characterized as block polycarboxylic acid compounds and blocked isocyanate compounds. Like Ohkuma and Crivello, there is no disclosure or suggestion of the two pairs of reactive components as presented in Claim 1, wherein reaction components of Pair 1 (i.e., claim features A and D) include a thermal cationic polymerization initiator (D) and a binder compound that has a reactive group capable of undergoing cationic polymerization. There is no disclosure or suggestion in the cited references of a composition including, *inter alia*, a thermal cationic polymerization initiator as claimed that reacts with a binder compound having a reactive group capable of cationic polymerization or of a process that includes, *inter alia*, heating the thermal photoinitiator to stabilize the holographic image.

In view of the foregoing, the rejection is requested to be withdrawn.

D. Claims 1-5, 7-14, and 16- 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,482,551 to Dhar (hereinafter "Dhar") in view of Ohkuma, Crivello, U.S. Patent No. 5,013,814 to Roth (hereinafter "Roth"), and U.S. Patent Publication No. 2004/0002008 to Hegel (hereinafter "Hegel"). Applicants respectfully traverse.

Dhar is generally directed to a composition that includes a matrix precursor and a photoactive monomer, wherein the matrix precursor and the photoactive monomer are selected such that the reaction by which the matrix precursor is polymerized during the cure is independent from the reaction by which the photoactive monomer is polymerized during patterning. Numerous polymerization reactions are provided in Dhar (see Col. 6, ll., 26-37). None of these include the use of a thermal cationic polymerization initiator as represented by Formulas 1 or 2 as is featured in Claim 1.

Roth is generally directed to araliphatic sulfonium salts and their use as curing agents and curing accelerator agents in the heat curing of cationically polymerizable compounds.

Hegel is generally directed to hologram data storage mediums having a sandwiched construction in which a holographic recording material is sandwiched between two substrates.

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Ohkuma and Crivello are discussed above.

Other than Roth, there is no disclosure or suggestion of a composition including, *inter alia*, a thermal cationic polymerization initiator as claimed that reacts with a binder compound having a reactive group capable of cationic polymerization or of a process that includes, *inter alia*, heating the thermal photoinitiator to stabilize the holographic image. With regard to Roth, one of skill in the art would not be motivated to substitute the curing agents of Roth for the photoinitiators of the other cited references. One of skill in the art would not be motivated to replace thermal cationic curing agents with photoinitiators. Even if one were to do that there would be not expectation of success since the other references t when viewed in their entirety teach and suggest the use of sensitizers to increase radiation sensitivity of the photoinitiators.

In view of the foregoing, the rejection is requested to be withdrawn.

E. Claims 1-5, and 7- 20 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Dhar in view of Ohkuma, Crivello, Roth, Hegel and further in view of PCT Application No. WO 02/15176 to Horimai (hereinafter "Horumai"). Applicants respectfully traverse.

Dahr, Ohkuma, Crivello, Roth and Hegel are discussed above.

Based on the translation of the Horimai Abstract alone, this reference is generally directed to optical systems without reducing information volume. The reference is cited to purportedly the use of a reflective layer so as to permit holographic recording without a second beam.

For reasons discussed above, the cited references when viewed in their entirety fail to teach or suggest a composition including, *inter alia*, a thermal cationic polymerization initiator as claimed that reacts with a binder compound having a reactive group capable of cationic polymerization or of a process that includes, *inter alia*, heating the thermal photoinitiator to stabilize the holographic image. A finding of "obvious to try" does not provide the proper showing for an obviousness determination. The requirement for a

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determination of obviousness is that "both the suggestion and the expectation of success must be founded in the prior art, not in applicant's disclosure" (emphasis added). *In re Dow Chem.*, 837 F.2d 469, 473, 5 U.S.P.Q.2d 1529, 1531 (Fed. Cir. 1988). An Office Action, then, cannot base a determination of obviousness on what the skilled person in the art might try or find obvious to try. Rather, the proper test requires determining what the prior art would have led the skilled person to do. For reasons discussed above, one of ordinary skill in the art would not be motivated to replace the thermal curing agents of Roth with the photoinitiator of the other cited references.

In view of the foregoing, the rejection is requested to be withdrawn.

Provisional Double Patenting Rejections

A. Claims 1 and 4-20 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-20 of copending Application No. 10/802,143.

The rejection has been rendered moot in view of the provisional terminal disclaimer co-pending Application No. 10/802,143 filed concurrently herewith.

B. Claims 1-20 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-20 of copending Application No. 10/802,143 in view of Crivello.

The rejection has been rendered moot in view of the provisional terminal disclaimer of co-pending Application No. 10/802,143 filed concurrently herewith.

C. Claims 1 and 4-20 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-17 of copending Application No. 10/937,188.

The rejection has been rendered moot in view of the provisional terminal disclaimer co-pending Application No. 10/937,188 filed concurrently herewith.

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D. Claims 1-20 stand provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over Claims 1-17 of copending Application No. 10/802,143 in view of Crivello.

The rejection has been rendered moot in view of the provisional terminal disclaimer co-pending Application No. 10/802,143 filed concurrently herewith.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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